Isolation and characterization of caprine arthritis encephalitis virus in goats from Poland

J. Kaba¹, M. Rola², M. Materniak², J. Kuźmak² M. Nowicki¹

¹ Department of Clinical Sciences, Faculty of Veterinary Medicine, Warsaw University of Life Sciences, Nowoursynowska 159c, 02-776 Warsaw, Poland
² Department of Biochemistry, National Veterinary Research Institute, Al. Partyzantow 57, 24-100 Pulawy, Poland

Abstract

The caprine arthritis-encephalitis virus (CAEV) was isolated from monocyte-derived macrophages (M/M), but not from PBMC of seropositive goats by co-cultivation with goat synovial membrane cells. Out of eight M/M co-cultures, CAEV was evidenced by the syncytia formation and presence of proviral DNA in two and four cultures, respectively. Two virus isolates from co-cultures showing cytopathic effects were further confirmed as CAEV by western blotting, PCR, and sequence analysis. The nucleotide sequence of gag gene showed 92.0% and 90.3% homology to the prototype CAEV-Co strain. Supernatants harvested from these cultures induced syncytia when cultured with uninfected cells and the resultant titer was $10^{3.5}$ and $10^{2.5}$ TCID₅₀ per ml. New CAEV isolates are suitable candidates for further analysis of their genetic and biological properties.

Key words: caprine arthritis-encephalitis virus, field isolates, CAEV nucleotide sequence

Introduction

Caprine arthritis-encephalitis virus (CAEV) was first isolated in the United States, in the mid 1970’s from the synovial fluid of an arthritic goat (Craford et al. 1980), and the brain of an encephalitic kid (Narayan et al. 1980). Subsequently, the virus was isolated from goats in the United Kingdom (Dawson et al. 1983), Australia (Ellis et al. 1983), Italy (Agrimi et al. 1987), and Switzerland (Krieg and Peterhans 1990). Infection with CAEV causes slow and persistent inflammatory diseases characterized by synovitis, mastitis, encephalomyelitis, and chronic interstitial pneumonia. These clinical symptoms are the result of infection of monocytes/macrophages, which are the main target for the virus. In these cells, virus replication is closely associated with the differentiation and maturation of monocytes to macrophages (Zink and Jonhson 1994). The development of a clinical disease takes a few months to a few years; however, most infected animals remain subclinically infected, and detection of specific antibodies is the only sign of infection.

The detailed molecular characterization of the CAEV-Co prototype strain (Saltarelli et al. 1990), and sequences of gag, pol and env genes of other isolates (Karr et al. 1996, Castro et al. 1999) clearly show that CAEV is closely related to the maedi/visna virus.